

ORIGINAL RESEARCH

Prevalence of non-alcoholic fatty liver disease in hypothyroid patients

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ABSTRACT

Background: The prevalence of NAFLD in adults has been reported to be as high as 33% making it the most common cause of chronic liver disease. The present study assessed prevalence of non-alcoholic fatty liver disease in hypothyroid patients.

Materials & Methods: 82 patients of hypothyroidism of both genders were selected and assessment of hypothyroidism was done with measurement of T3, T4 and TSH. Ultrasonography (USG) of all patients was performed and steatosis was graded as 1 if less than 33% of the hepatocytes were affected, grade 2 when 33 - 66% of the hepatocytes were affected, and grade 3 if more than 66% of the hepatocytes were affected.

Results: Out of 82 patients, males were 50 and females were 32. TSH level <5 μ IU/ml was seen in 7, 6-20 μ IU/ml in 5, 21-35 μ IU/ml in 10, 36-50 μ IU/ml in 20, 50-65 μ IU/ml in 16 and >65 μ IU/ml in 24 patients. The difference was significant ($P < 0.05$). Fatty liver grade I was seen in 10, II in 18 and III in 6 patients. Serum ferritin level in grade I males was 164.5 and in females was 170.2. In grade II males was 512.4 and in females was 234.6 and in grade III males was seen in 586.2 and in females was 376.4. The difference was significant ($P < 0.05$).

Conclusion: Serum ferritin levels were found to be increased in patients of fatty liver with hypothyroidism. Serum ferritin could help in predicting the natural history of NAFLD in hypothyroidism patients.

Key words: Hypothyroidism, Serum ferritin, Non- alcoholic fatty liver disease

INTRODUCTION

Non- alcoholic fatty liver disease (NAFLD) is a chronic liver disease with a histological spectrum ranging from steatosis alone to non- alcoholic steatohepatitis (NASH), the latter having an increased risk for progression to cirrhosis.¹ The prevalence of NAFLD in adults has been reported to be as high as 33% making it the most common cause of chronic liver disease in the United States.² Thyroid dysfunction especially hypothyroidism has been associated with insulin resistance, dyslipidemia and obesity all of which are important components of the metabolic syndrome.³

Hypothyroidism is a typical endocrine framework issue which affects long lasting wellbeing.⁴ Numerous specialists have played the physiological part of the thyroid organ truly, not just as a result of the thyroid hormones' basic function in the cell digestion and homeostasis of energy. But likewise, in light of the more significant reality that different problems are related

with thyroid dysfunction.⁵ Hypothyroidism can be separated to the hypothyroidism at subclinical and plain hypothyroidism. Subclinical hypothyroidism is known to be a condition with a level of expanded thyroid-involving hormone (TSH) over as far as possible, a degree of typical serum free thyroxine (fT4) and no clear clinical indication. Disturbances in thyroid hormone concentrations may promote hyperlipidaemia and obesity, thus contributing to NAFLD. Early identification of at-risk patients is important since treatment of hypothyroidism may reduce the risk of NAFLD and potential complications.⁶ The present study assessed prevalence of non-alcoholic fatty liver disease in hypothyroid patients.

MATERIALS & METHODS

The present study consisted of 82 patients of hypothyroidism of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Assessment of hypothyroidism was done with measurement of T3, T4, TSH. Ultrasonography (USG) of all patients was performed and large fat vacuoles in the liver parenchyma, displacing the nuclei to the border of the cells made diagnosis. Steatosis was graded as 1 if less than 33% of the hepatocytes were affected, grade 2 when 33 - 66% of the hepatocytes were affected, and grade 3 if more than 66% of the hepatocytes were affected. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 82		
Gender	Male	Female
Number	50	32

Table I shows that out of 82 patients, males were 50 and females were 32.

Table II Assessment of TSH level

TSH (μ IU/ml)	Number	P value
<5	7	0.05
6-20	5	
21-35	10	
36-50	20	
51-65	16	
>65	24	

Table II shows that TSH level <5 μ IU/ml was seen in 7, 6-20 μ IU/ml in 5, 21-35 μ IU/ml in 10, 36-50 μ IU/ml in 20, 50-65 μ IU/ml in 16 and >65 μ IU/ml in 24 patients. The difference was significant (P< 0.05).

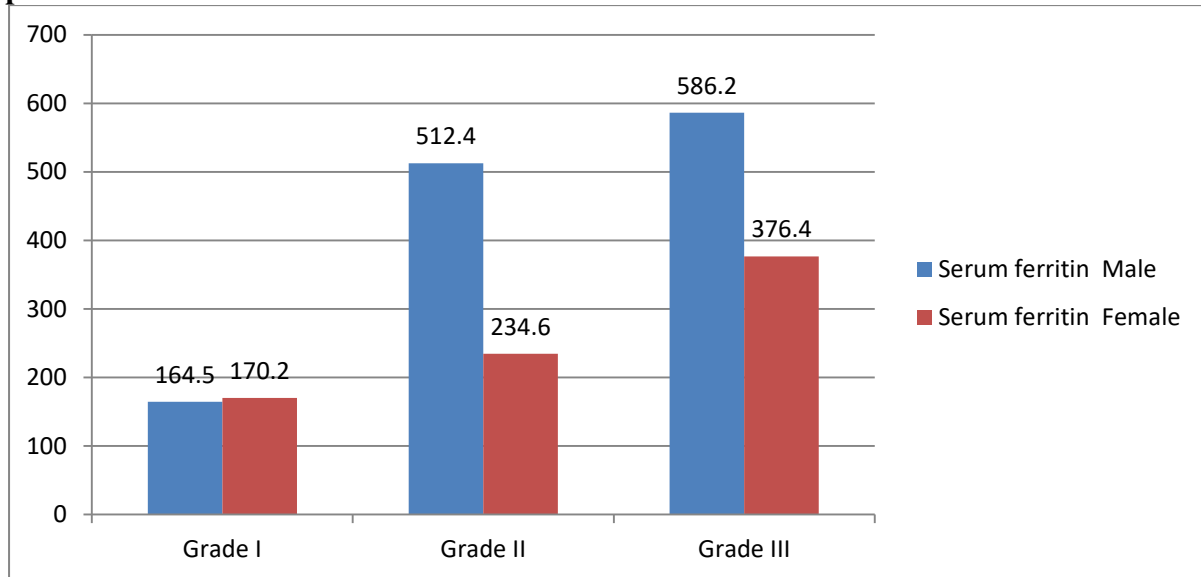
Table III Grading of fatty liver and serum ferritin level in NAFLD with hypothyroid patients

Fatty liver grade	Number	Serum ferritin		P value
		Male	Female	
Grade I	10	164.5	170.2	0.94
Grade II	18	512.4	234.6	0.01
Grade III	6	586.2	376.4	0.02

Table III shows that fatty liver grade I was seen in 10, II in 18 and III in 6 patients. Serum ferritin level in grade I males was 164.5 and in females was 170.2. In grade II males was

512.4 and in females was 234.6 and in grade III males was seen in 586.2 and in females was 376.4. The difference was significant ($P < 0.05$).

Graph III Grading of fatty liver and serum ferritin level in NAFLD with hypothyroid patients



DISCUSSION

Non-alcoholic fatty liver disease (NAFLD) comprises a broad spectrum ranging from simple steatosis, non-alcoholic steatohepatitis with fibrosis, which can eventually progress to cirrhosis and hepatocellular carcinoma.⁷ Non-alcoholic fatty liver disease (NAFLD) means accumulation of fat mainly triglycerides exceeding 5% of liver weight, affecting approximately 20% of population in developed countries.⁸ The link between diabetes and NAFLD is well established unlike hypothyroidism which has mushroomed to be a risk factor for NAFLD very recently. However, clinical data supporting this association are incomplete and the pathophysiology underlying this association remains unclear.^{9,10} Additional information is needed to confirm and better characterize the proposed association between NAFLD and hypothyroidism.¹¹ The present study assessed prevalence of non-alcoholic fatty liver disease in hypothyroid patients.

In present study, out of 96 patients, males were 36 and females were 60. Ludwig et al¹² investigated the association between thyroid dysfunction and hepatic steatosis in 2,445 subjects (51.7 % females) aged 18 to 65 years. The prevalence of hepatic steatosis in the study collective was 27.4 % (n = 349). The serum thyroxin (TT4) concentration in subjects with hepatic steatosis was reduced (p = 0.0004). Adjusting for age, or BMI, there was an increased prevalence of hepatic steatosis in subjects with reduced TT4 concentrations.

We found that TSH level <5 μ IU/ml was seen in 7, 6-20 μ IU/ml in 5, 21-35 μ IU/ml in 10, 36-50 μ IU/ml in 20, 50-65 μ IU/ml in 16 and >65 μ IU/ml in 24 patients. Parikh et al¹³ assessed the prevalence of hypothyroidism in patients with non-alcoholic fatty liver disease (NAFLD). 300 controls were selected on the basis of negative ultrasound examination. The mean age of NAFLD patients was 44.3 years and of controls was 41.6 years, respectively. The female-to-male ratio of NAFLD patients was 1.8:1 and of controls was 1.94:1, respectively (p>0.05). Hypothyroidism was significantly more common in NAFLD patients compared to controls. Eighty-four patients were detected to have hypothyroidism in NAFLD group compared to only four patients in control group.

We observed that fatty liver grade I was seen in 10, II in 18 and III in 6 patients. Serum ferritin level in grade I males was 164.5 and in females was 170.2. In grade II males was 512.4 and in females was 234.6 and in grade III males was seen in 586.2 and in females was 376.4. Loria et al¹⁴ come to the conclusion that hepatic steatosis may develop from hypothyroid induced hyperlipidemia and overweight.

Patel et al¹⁵ found that out of 30 NAFLD cases, 19 (63.3%) were male and 11 (36.7%) were female. From 19 male NAFLD cases, majority cases i.e. 8 cases (42.1%) were having NAFLD USG grade-II and out of 11 female NAFLD cases, 5 (45.4%) were having NAFLD USG grade-II. $P=0.063$, which was statistically insignificant showing no significant relationship between gender & USG grading of NAFLD. Majority NAFLD cases i.e. 17 (56.7%) were of age group 40-59 yrs. and no NAFLD case was detected above 60 yrs. of age. In the study group, 77 cases were having $TSH \geq 4.1$ mIU/L, from which 27 (35%) had NAFLD and rest 23 cases were having $TSH < 4.1$ mIU/L, of which 3 (13%) had NAFLD.

CONCLUSION

Authors found that serum ferritin levels were found to be increased in patients of fatty liver with hypothyroidism. Serum ferritin could help in predicting the natural history of NAFLD in hypothyroidism patients.

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